JOINT RELEASE
Greenwich Board of Education and Town of Greenwich, Greenwich, CT

Tuesday, March 6, 2012

GREENWICH HIGH SCHOOL ENVIRONMENTAL TESTING UPDATE

Site Investigation Status

Highlights: *An environmental study was completed at the Greenwich High School over the December 2011 break. The results of this study are discussed in this update, and tell us:*

- *The site continues to be safe for its current use (high school and athletic fields). The study confirmed that the cleanup measures taken in the fall (when soil was removed) were protective (impacted areas were removed), and that no new impacted surface areas were found.*
- *Soil and groundwater samples taken during the study indicate that additional work is necessary. Additional environmental study is needed to get a better definition of where and how deep the chemicals are present. While groundwater impacts appear to be localized, we need more data to confirm this. We anticipate that some cleanup of deep soil will be necessary based on the concentrations found.*
- *While surface water samples were found to be free of chemicals, further study of sediment in the stream and pond is necessary. It is likely that chemicals found in sediment may be related to other urban sources in the area (e.g., stormwater runoff). This will be investigated further.*
- ***ALL FIELDS ARE OPEN FOR IMMEDIATE USE!***

Introduction

In mid July 2011, during the course of the excavation work for the Greenwich High School Music Instructional Space and Auditorium (MISA) project, unexpected soil conditions were discovered in the West (or back) parking lot, adjacent to the athletic fields. This finding prompted several rounds of environmental testing. Initial test results showed levels of a class of chemicals known as polychlorinated biphenyls (or PCBs) in soil above standards set by the Connecticut Department of Energy and Environmental Protection (DEEP). These findings prompted the closure of all athletic fields at the High School, as a precaution, until interim remedial measures (called IRMs) were completed. The IRMs included removal of surface soil in several areas surrounding the fields, which allowed the reopening of fields 1, 6 and 7 for use last fall. Concurrence to open fields 2, 3, 4 and 5 was received Friday, March 2. A comprehensive environmental study of the area is currently underway. The first phase of this study was conducted over the December 2011 break. This update provides a summary of the sampling results.

Who is responsible for the environmental study? Are there government agencies involved?

The Greenwich Public Schools/Board of Education and the Town of Greenwich are working in collaboration to address the environmental concerns at the Greenwich High School. The Town of Greenwich's and the State of Connecticut's Department of Public Health (DPH) and DEEP, and the Federal Environmental Protection Agency (EPA) are also involved in consultation on the testing and remediation plans.

Who is conducting the environmental study?

The Town has contracted with an experienced environmental services company, AECOM, to conduct the environmental study and develop cleanup plans for the project. AECOM has assigned a CT Licensed Environmental Professional to oversee the work being done.

What environmental testing was done in December 2011?

Over the school's December 2011 break, an environmental sampling program was completed. This program included collecting soil samples from beneath the parking lots, within fields 2 and 5, and adjacent to turf covered fields, collecting surface water and sediment samples from the pond and stream (West Brothers Brook) adjacent to the High School athletic fields, and installing and sampling groundwater monitoring wells.

How were the samples collected?

For each type of material there is a unique and specific method for collecting a sample in such a way that it does not disturb the natural state of that material and ensures appropriate quality control and quality assurance. These methods were described in a Work Plan that was written for the project. The methods outlined in the Work Plan were followed and documented by the field team members while collecting the samples.

Soil samples were collected using a track-mounted drill rig

with a soil sampling device attached to it. At each sampling location, the sampling device was extended into the ground to collect soil samples to depths up to 20 feet. Each soil sample was reviewed by a geologist, who tracked the type of soil found (e.g., sand, clay, etc.), and the attributes of the sample (e.g., whether staining was noticeable, or the color of the sample, etc.). A total of 180 soil samples were collected from 49 borings.

Surface water and sediment samples were collected from the pond located just south of the High School and West Brothers Brook (adjacent to the fields). A total of 32 sediment and 6 surface water samples were collected.

Groundwater samples were collected from four monitoring wells installed at the site. A specialized drill rig was used to create a deep, narrow hole in the ground (called a borehole), into which a monitoring well was assembled and placed into the drilled borehole. Groundwater samples were collected from the wells using a pump to draw groundwater to the ground surface. The groundwater is pumped at a slow rate to ensure that the groundwater is not disturbed during the pumping.

All the samples collected were shipped to a state certified laboratory for analyses. The analytical data were then reviewed to ensure the data are of sufficient quality for decision making purposes.

What were the sample results?

A variety of chemicals were discovered in the samples collected, including PCBs, polycyclic aromatic hydrocarbons (called PAHs), metals such as lead and arsenic, and chlordane (a pesticide). Please refer to the text box at the end of this update for additional information regarding these chemicals.

Soil Samples: For surface soil (soil down to 1 foot below the ground surface), the study confirmed the results of earlier tests, and confirmed that the cleanup measures taken in the fall (when soil was removed) were protective (impacted areas were removed); no new impacted surface areas were found.

The major focus of the December 2011 study was to investigate the fill areas (deep soil samples). Large portions of the study area appear to be mostly free of chemicals, including fields 5, 6, and 7, and the area immediately surrounding the High School buildings, although PCBs, PAHs, and metals (lead and arsenic) were found in other areas. PCBs were found in an area of particular concern from deep soil samples collected within the strip of land between the High School's western parking lot and Fields 3 and 4. These samples were collected from 2 to 18 feet below the ground surface. A review of historical drawings that show what the area looked like before the High School was constructed indicate that this area used to be a pond or perhaps a deep area of the brook. It appears this area was filled in for school construction. This may help explain where some of the PCBs come from. While these levels are not posing any immediate health risk to site users at this time (because people are not exposed to the soil this deep), the levels are of concern for potential impacts to groundwater.

Groundwater and surface water samples: One of the four groundwater monitoring wells sampled was free of PCBs and other chemicals of interest (metals, volatile organic chemicals, pesticides, PAHs). However, groundwater samples from two wells did contain PCBs, and samples from one of these wells and a fourth well contained lower levels of PAHs. These impacts appear to be localized, coinciding with where soil impacts were found.

One well, which is located in a spot where some of the highest PCB levels were found in soil (a spot between Field 3 and the west parking lot) had a PCB concentration on the order of 50 ppb (please see text box, *What is a ppb?*). The other well, which is located close to the Brook, only had a PCB concentration of 0.7 ppb. No PCBs were found in the surface water samples taken in the brook.

Sediments: Samples taken from the sediment in the brook contained metals, PAHs, and pesticides. One sediment sample location in the pond contained a low level of PCBs.

What do these results mean?

Regulatory agencies have developed conservative screening levels that are considered to be "safe" levels of chemicals to which we can be exposed under any circumstance. These are levels to which people could be exposed without suffering health effects, and typically include very conservative exposure assumptions; for example, that a person lives on the site for 30 years, and ingests (eats) up to 50 milligrams of soil per day from the site. Higher acceptable levels can be developed on a site-specific basis, which take into account specific characteristics of the site (for example, the number of years and amount of time during the day a person is exposed to the soil). As a preliminary step in evaluating the data we have so far, we compared the concentrations detected in our samples to the most conservative available DEEP screening levels. This comparison will give us a first look at where potential environmental issues are present. We do plan to proceed with determining site-specific screening

What is a ppb?

A "ppb" is one part per a billion parts. It is similar to:

- One second in 32 years
- One penny in $10,000,000
- One inch in 16,000 miles

levels for the site; thus these comparisons will be updated once we go through that process.

It is noted that, in addition to these conservative risk-based screening levels, the federal EPA has established a regulatory level for PCBs under the Toxic Substances Control Act (TSCA). For areas that have no restriction in land use (i.e., for residential use), the TSCA level for PCBs in soil is 1,000 ppb. However, if soil is covered with 10 inches of "clean" (unimpacted) soil or 6 inches of concrete or asphalt, the TSCA level is higher (10,000 ppb). The data from the High School study were also compared to these TSCA levels.

Soil. Arsenic was found in soil above conservative screening levels across much of the southern part of the site, while lead was found above screening levels across much of Fields 2 and 3. Arsenic occurs naturally in soil and minerals, especially in certain areas of the country (including the Northeast US). PAHs were also found in a few soil samples above conservative screening levels. PAHs are found in common materials such as gasoline, asphalt, tar, and charcoal. Urban soil normally contains PAHs, often at levels exceeding regulatory standards for residential soil. The next step of the study for these chemicals will be to assess whether these levels are related to the site (in other words, are related to the fill), or are from other "background" sources.

PCBs were found above conservative screening levels and above TSCA levels in deep samples. The next step of the study for PCBs in soil will be to better define where (the distribution and extent) PCBs are located in soil.

For **groundwater**, as mentioned previously, PCBs were found in two of the four monitoring wells. Additional groundwater sampling will take place to give us a better picture of where and how the PCBs are present in groundwater. Some of this work was done over the February 2012 school break, but these data are not yet available. It is noted that Town residents are supplied with public water by Aquarion. The public water supply system has been in place since the 1940s, and is regularly monitored in accordance with state and federal requirements.

For **surface water and sediment**, additional sampling will take place to further review the location and presence of chemicals in the Brook and pond. In particular, we will focus on whether the chemicals found in the samples collected so far are related to the known impacted area at the High School, or related to other "background" sources of chemicals (like stormwater runoff).

All Fields are Open for Use

The Town completed all the interim remedial measures (IRMs) necessary to make the fields safe for use this spring. Reports outlining the completion of this work, including photos, drawings, etc. have been provided to the EPA, the DEEP, and the DPH. Fields 1, 6, and 7 were cleared for use last fall, and the regulators concurred with the reopening of fields 2, 3, 4 and 5 on Friday, March 2.

When will we know more?

The sampling activities completed so far have helped us understand the site better, but we still need to sample under fields 3, 4, 6, and 7 to have a more complete understanding of overall site conditions. We cannot do additional sampling under the fields until June, when sports activities are completed and we can have free access to these fields. Because the fields are artificial turf, we could not sample them in the winter months given the need for warm temperatures to repair the turf carpet, nor did we want to interrupt spring sports.

It is typical for site characterization to proceed in the stepwise fashion AECOM has used so far – each time a sampling plan is prepared and completed, it provides information that in turn dictates what the next steps should be. While that can be frustrating for those outside the process, it is also how we manage and control the costs of the sampling program. One can see how the results from each sampling round can have a significant effect on what is next required – making it challenging to forecast the total budget required for this kind of work.

What will happen next?

We have much to do in the coming few months including:

- Evaluating the sample results from the February 2012 sampling.
- Continue sharing and communicating the results of the ongoing studies.
- Performing a required (standard procedure) survey of residents within a 500 feet mile radius of Greenwich High School to find out if groundwater wells are present.
- Preparing for additional sampling events during the April 2012 vacation break and in June and July.
- Beginning a study (called a Feasibility Study) to identify and evaluate remedial (cleanup) alternatives for the site. This study will include estimates of the overall cost for the cleanup, which we hope will be wrapped up by late Fall 2012.

Chemical Information

What are PCBs?

PCBs are a class of chemicals known as polychlorinated biphenyls. These chemicals are man-made and do not occur naturally. PCBs were first manufactured commercially in the U.S. in 1929, and have been used in many different products including hydraulic fluid, pigments, carbonless copy paper, vacuum pumps, compressors, heat transfer systems, and in household appliances, such as refrigerators, television sets, and fluorescent lighting fixtures. Their primary use, however, was as a dielectric fluid (a fluid that doesn't conduct electricity) in electrical equipment. PCBs were used in this fashion because of their stability and resistance to thermal breakdown, as well as their insulating properties -- they were the fluid of choice for transformers and capacitors.

In 1976, Congress enacted the Toxic Substances Control Act (TSCA), which directed the EPA to ban the manufacture of PCBs and regulate their use and disposal. EPA accomplished this by issuing regulations in 1978. The regulations banned the manufacture of PCBs, but continued to allow equipment containing PCBs to be used for the remainder of their useful lives.

PCBs may be found in the environment due to leaks or spills of PCB liquids from manufactured items such as capacitors, transformers, or other electrical equipment. PCBs in the environment do not break down easily. PCBs tend to bind tightly to soil, and remain attached even if the soil is moved.

Human exposure to PCBs is primarily from eating fish or other foods containing PCBs, or, if PCBs are present in soil, from accidentally eating some contaminated soil. PCBs may also be absorbed through the skin, although this is of less concern than eating food containing PCBs, because the skin is a barrier to PCB absorption. Normal cleanliness (washing dirt from skin with soap and water) greatly reduces potential absorption of PCBs from soil.

What are PAHs?

PAHs or polycyclic aromatic hydrocarbons are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot. Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust. PAHs typically enter water through discharges from industrial and wastewater treatment plants. Most PAHs do not dissolve easily in water; rather, they stick to solid particles and settle to the bottoms of lakes or rivers. In soils, PAHs are most likely to stick tightly to particles. Microorganisms can break down PAHs in soil or water after a period of weeks to months.

People can be exposed to PAHs by breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing. Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced over the years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

Because of human activities (especially the use of gasoline containing lead), high levels of lead may be found in the air, water, dust, and soil. Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.

People and animals are typically exposed to lead by eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder, where lead can leach out into the water. Exposure also occurs if one spends time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust. Many of us are exposed to lead through use of our everyday health-care products (e.g., dandruff shampoo), or through use of folk remedies that contain lead.

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. Arsenic occurs naturally in soil and minerals, especially in certain areas of the country. Arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. Other arsenic compounds are used as pesticides, primarily on orchards.

Arsenic may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching. People can be exposed to arsenic if they ingest small amounts present in food and water or breathing air containing arsenic (for example, breathing sawdust or burning smoke from wood treated with arsenic). Some

people are exposed to arsenic because they live in areas with unusually high natural levels of arsenic in rock.

What is Chlordane?

Chlordane is a manufactured chemical that was used as a pesticide in the U.S. from 1948 to 1988. Chlordane is a thick liquid whose color ranges from colorless to amber, and has a mild, irritating smell. Until 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens. Because of concern about damage to the environment, the EPA banned all uses of chlordane in 1983 except to control termites. In 1988, EPA banned all uses.

Chlordane entered the environment when it was used as a pesticide on crops, on lawns and gardens, and to control termites. Chlordane sticks strongly to soil particles at the surface and is not likely to enter groundwater; it breaks down very slowly. It can stay in the soil for over 20 years.

People are mostly exposed to chlordane from eating contaminated foods, such as root crops, meats, fish, and shellfish, or from touching contaminated soil.

For all information requests, please contact:

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